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ABSTRACT

This review of the literature begins by exploring the development of computer literacy as a discipline since its introduction in colleges and universities around 1965 and in economically privileged high schools around 1970. The impact of a conference sponsored by the National Science Foundation and Human Resources Research Organization in 1980 on the evolution of computer literacy both as a concept and as a curriculum is then discussed. It is noted that this was the beginning of the debate over whether or not computer literacy should include programming. The different approach taken by the "new" computer literacy in the early 1980s is also briefly discussed, and five predictions for the future based on a consensus of computer literacy "thinkers" are presented: (1) software development will improve and increase; (2) textbook publishers will continue to control computer literacy curriculum; (3) teachers and administrators will continue to need more and better training; (4) the use of technology will alter the organization of schools; and (5) computer hardware will continue to drop in price and improve in performance. Discussions of the issues involved in three major areas that should be addressed by planning teams--training, hardware and software acquisition, and curriculum--conclude the paper. (RP)

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COMPUTER LITERACY. IS IT FOR EVERYONE?

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The history of computers begins in the 1940s. This new invention is now changing the way we think, play, learn and live. The computer is fast becoming the focal point around which everything else will adapt and fit. Edcuators have been exploring the place of the computer for almost as long as it has been around. To address the issue of "computer literacy - for everyone?", the development of computer literacy as a discipline needs to be put in perspective.

Computer literacy as a course was first introduced around 1965 at many colleges and universities and around 1970 in many economically privileged high schools. At this point "literacy" was not an issue. The courses of study were too new for the developers to worry about titles. A study conducted in 1971-72 revealed 19 high school or high school/college cooperative programs teaching some type of computer based education (Kurshan, 1973). Most of the courses taught were devoted to teaching a computer language, usually Fortran or PL/1 or to using computer-assisted instruction. A few syllabi included some discussion of social implications. During this period, computer literacy was really computer programming. The courses at the universities were taught by the newly forming computer science faculties and at the high school by early computer hackers and hobbyists.

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The programming courses were successful and well received but there were not enough. The individuals involved with this new "computer literacy" were also concerned with the future. The impact of the computer revolution was still only a small issue. The major questions asked by the creative thinkers were: can machines think; will timesharing work; where should computer science be studied; and how was computer literacy developing as a discipline (King, 1985). A definition of computer literacy was just evolving and is still evolving today.

Around 1970 "corputer literacy" became a defined discipline. Colleges introduced Computers in Society courses. High schools offered courses with more than programming. An independent course was the norm and the goal of educational planners. Computer literacy was going to be treated like driver education, typing and music. It was a "segregation" curriculum as suggested by John Arch in a guest editorial of The Computing Teacher (May, 1986). The course was taken as just another subject to master.

This course change was further directed by two events. First was a conference in Washington, DC in December, 1980 sponsored by the National Science Foundation and HumRRO (Human Resources Research Organization). Second was the availability of the first microcomputers - the PET, the Apple and the TRS-80 Model 1.

The HumRRO conference attempted to define the "new" computer

literacy. The great debate was begun over whether or not computer literacy should include programming. The five major topics included in most literacy courses were computer systems, history, algorithms (i.e. flowcharting), programming and social implications. Computer literacy was vaguely defined as the ability to understand how the computer worked and how to interact with the computer. Many schools still had limited computer access so the courses were generally considered "hands-off" rather than "hands-on".

The leaders at the HumRRO conference not only explored computer literacy not only in its current form but also addressed the future. The issues discussed included decentralized computing and the use of computer assisted instruction (CAI). CAI was very primitive but the computer had the potential for rapid delivery. The PLATO project and Suppes' work at Stanford promised new methods for teaching and learning. The attendees also addressed the issue of computer access versus cost per student hour.

It is now 1986, the "new" computer literacy is no longer new, it's old. But implementors of the "new" computer literacy have taken a different approach. It is the era of applications and problem solving tools. This is easily documented by examining the programs at recent computer education conferences. Five years ago the majority of sessions examined the "segregated" computer course. The content of this course was dissected and the next courses after a computer literacy course were outlined. Today the

sessions are largely dedicated to the use of application tools and the types of tools available. The tools presently discussed and taught include databases, spreadsheets, word processing and graphics. Many computer literacy texts are available that teach the applications, programming and society issues. Computer Literacy Through Applications (published by Houghton-Mifflin) is an example of a text that emphasizes applications. An integrated software package has been developed and is correlated with the text. The major concerns are access for every student and the personal computer of choice. The leaders are again discussing the future but with more urgency. The question most heard is "Is this the beginning of a computer revolution?" or "Is it a revolution?"

Presently the "old" computer literacy appears to be for everyone. A large number of states require some type of computer literacy course in the 7th, 8th or 9th grade. Colleges and universities are requiring students to own microcomputers and to meet varied computer literacy requirements for graduation. But what about the "new" computer literacy? Is it for everyone? The answer needs to be delayed once again while we explore the future. Without a crystal ball, the predictions can only be based on the past, present and extrapolation into the future.

What will 1995 bring for computer literacy? The hope is that computer literacy will become merged into all areas of the curriculum. The interdisciplinary approach appears to be more realistic since real world problems tend to be interactive (King,

1985). In addition, many computer literacy objectives can be correlated with other content areas. This new approach will increase problem solving activities. The computer will become a natural tool for solving specific problems within a content area. Applications will be taught as basal skills and applied within appropriate disciplines. For example, word processing will be used in diverse areas such as biology for lab reports and creative writing for poetry design. Databases will be used in history and chemistry.

As more disciplines use the computer, school systems will be forced to supply hardware and software across the curriculum. The equity issues will take on different dimensions. Everyone will have access but will everyone be computer literate? The student required to use the computer for drill and practice will not necessarily explore the creativity of learning with a computer. The male versus female issue will also change. All students will use the computer but will "girls" use the machines differently? The different uses need to be identified and a curriculum which insures diversity of approaches for boys and girls will need to be implemented.

Computer literacy will be controlled and directed by the information explosion. Students will need to have access to tools that help them acquire and process information. Database software will be the foundation of the future integrated software packages. As the world changes more simulations and modeling software will

be used for problem solvng. The simulations will model more of the real world. Computer literacy will become technological literacy.

Other predictions about the future are not too hard to guess but are difficult to define. Many computer educators have written about the future. The following predictions reflect the consensus of a community of computer literacy "thinkers." These predictions will force school systems to carefully plan for the future.

1. Software development will improve and increase. Eventually "good" instructional software will be readily accessible. The software will be changeable and integrated with other technologies such as video. Teachers will be able to modify programs to meet the specific needs of each class. The new software will be a catalyst for curriculum revision. (Moursund, 1986; Mojkowski, 1985)

2. The publishers of textbooks will continue to control computer literacy curriculum. Much of the software will be directly correlated with standard textbook series. The more creative uses of the computer in the classroom will be slow to arrive.

3. Teachers and administrators will continue to need more and

better training!

4. The use of technology will alter the organization of schools. (Mojkowski, 1985) School systems will have to move toward high-tech schools that provide extensive computer interaction and non-traditional learning situations. The most interesting changes will occur first in the elementary and middle schools. Teachers at this level are less resistant to change. They often bring a fresh creativity to the classroom. (Moursund, 1986)

5. Computer hardware will continue to drop in price and improve in performance. However, microcomputers will always have limitations. The limits will change but they will be no less restricting and must be considered when purchasing tools for education.

Again, I ask "Is computer literacy for everyone?" The answer to this question may only be another question. It is no longer enough for everyone to be computer literate. Students will need to develop the skills necessary to use technological reasoning and decision making. (Splete, 1976) The "new computer literacy will expand to "technological literacy." Is it for everyone?

To deal adequately with the predictions for technological

literacy, school systems will need to engage in strategic planning - NOW! This planning should be specific and long term. As noted by R.I. Benjamin in an article by Dan Updegrove (1986) "planning isn't strategic if it does not explicity take into account changes in and new opportunities being presented by information technology" (p.12). There are three major areas to be addressed by the planning team:

1. Training
2. Hardware and software acquistion
3. Curriculum

Training: The training of teachers, administrators and school board members must be a regular part of the operation of the school districts. This issue of training is long term and significant to the future of education. Training should be designed to meet the varied requirements of each of the constituencies in the district. In-service programs can be short (1 or 2 hours) or long (2 or 3 days or once a week for a semester). Local universities can provide instruction and college level credit. Once a core group is trained they should become instructors within each school. New teachers being hired should be technologically literate and this knowledge should be placed in areas where trained personnel is deficient.

Acquisition: Both hardware and software are constantly changing.

Acquisition involves maintenance, new purchases and upgrades. All three types of acquistion must become a regular part of budget planning and discussion. Maintenance such as repair of hardware and licenses for software needs to be built in as yearly budget items.

Curriculum: The curriculum will also need to be reviewed and revised yearly. The changes should be applied across content areas and within all grades. As the computer is used in the schools, the curriculum will experience a "push-down" phenomena. For example, word processing which was first introduced in high school and/or middle school is now being taught in elementary schools. These early learned skills will need to be reintroduced and mastered throughout the rest of the students' schooling. Upper level teachers will come to expect word processing skills as they already expect some basic math computational skills.

The issue at hand is computer literacy. As our environment becomes more influenced and absorbed by technology the computer will be part of our lives. Perhaps everyone will naturally be computer literate. The computer literacy of yesterday and today will give way to a "new" technological literacy. If history repeats itself, the question of today - Is computer literacy for everyone? - will become one of tomorrow - Is technological literacy for everyone?

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